

Sounding Rocket EUV Observations of Local B Stars to Determine Their Potential for Supplying Intergalactic Ionizing Radiation

Completed Technology Project (2018 - 2021)

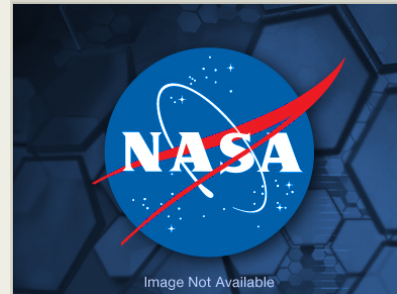


Project Introduction

This proposal for the NASA Earth and Space Science Fellowship aims to support, calibrate, and launch DEUCE, the Dual-channel Extreme Ultraviolet Continuum Experiment. DEUCE is a sounding rocket-based instrument that will obtain the first flux calibrated spectra of two nearby B stars in the Lyman continuum and far UV, with the goal of understanding hot star contribution to reionization. Current reionization simulations utilize models of stellar ionizing flux output, as no calibrated observations of these stars exist in the hardest ionizing 700-900Å bandpass. However, such models have historically proven poor at predicting the ionizing radiation output of these stars. DEUCE, in tandem with sightline modelling that allows for interpretation of its observations, will provide the first flux calibrated measurements that can constrain stellar models and allow for an accurate determination of the ionizing flux output of hot stars. DEUCE consists of a Wolter II grazing incidence telescope feeding a two channel high/low resolution Rowland circle spectrograph with a novel large-format, low-noise MCP detector. Testing of this new class of detector supports the NESSF's specific astrophysics call for detector analysis and technology development. DEUCE also directly answers objective 1.6 of the NASA 2014 Strategic Plan and astrophysics goal 4.4 of the NASA 2014 Science Plan, both of which call for research into how galaxies and the universe evolved. DEUCE represents the first calibration of stellar ionizing flux models in the 700-900Å regime, and will ultimately help to shed light on the viability of B stars as major contributors to reionization, bettering our understanding of this critical period in the universe's evolution.

Anticipated Benefits

The Astrophysics Research and Analysis program (APRA) supports suborbital and suborbital-class investigations, development of detectors and supporting technology, laboratory astrophysics, and limited ground based observing. Basic research proposals in these areas are solicited for investigations that are relevant to NASA's programs in astronomy and astrophysics, including the entire range of photons, gravitational waves, and particle astrophysics. The emphasis of this solicitation is on technologies and investigations that advance NASA astrophysics missions and goals.



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Organizational Responsibility

Responsible Mission Directorate:

Science Mission Directorate (SMD)

Responsible Program:

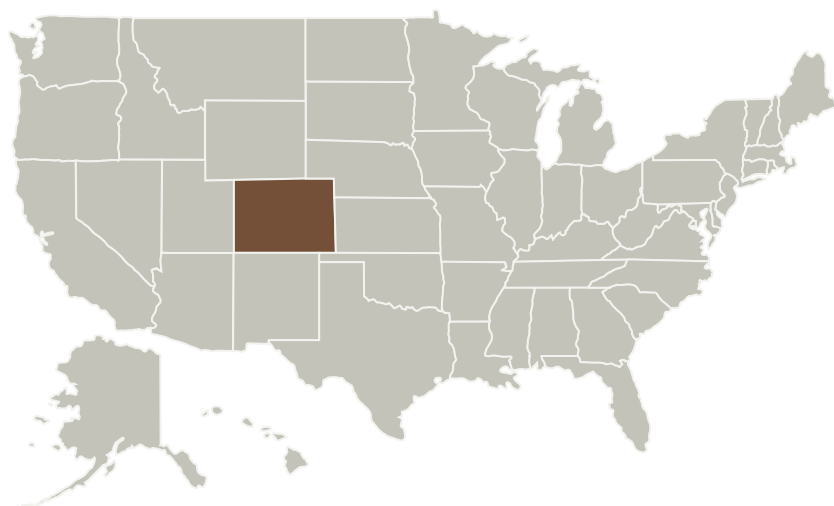
Astrophysics

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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
University of Colorado Boulder	Supporting Organization	Academia	Boulder, Colorado

Primary U.S. Work Locations

Colorado

Project Management

Program Manager:

Joe Hill-kittle

Principal Investigator:

James C Green

Co-Investigators:

Jessica Rowell

Nicholas Erickson

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.3 In-Situ Instruments and Sensors
 - └ TX08.3.6 Extreme Environments Related to Critical System Health Management

Target Destination

Outside the Solar System